

AMENDMENTS TO THE SPECIFICATION:

Please insert the following heading after the title beginning on page 1, line 2, as follows:

--TECHNICAL FIELD--

Please insert the following heading after the title beginning on page 1, line 6, as follows:

--BACKGROUND--

Please amend the paragraph beginning at page 1, line 22, as follows:

Most access networks have the capability to allow an end user, if he so chooses, to gain access several times simultaneously, using the same or different Internet service providers. Each time the user logs on he gets another IP address. To the core IP network these addresses all appear to be separate users. When it is heavily loaded, the core network divides its bandwidth up equally between the addresses contending for access, so a user who has logged on three times will get three times as much bandwidth as a user logged on only once. The mechanism to log on a plurality of times could be multiple asynchronous transfer mode (ATM) permanent or switched virtual connections (PVCs or SVCs), or the PPPoE (Point to Point Protocol over Ethernet). However, if the ~~internet~~-Internet application streaming the data to the end user receives requests for a particular stream from three separate IP address it will send the same data to all three addresses and so the additional bandwidth will be of no practical use, as the data will simply be duplicated between the various links.

Please insert the following heading after the title beginning on page 2, line 3, as follows:

--SUMMARY--

Please amend the paragraph beginning at page 2, line 3, as follows:

According to one aspect of the ~~invention~~disclosure, there is provided a method of accessing data from an internet application over a distributed information network, wherein a user terminal generates a plurality of access requests for the same data to be delivered by the ~~internet~~Internet application over a plurality of routes, each request conveying an indication of their common origin to the targeted internet application, the internet application identifies whether a plurality of addresses making requests for the same data are associated with the same end user, and where this is the case splitting the requested data and streaming different parts of the data to the different addresses requesting it, and the user terminal receives the requested data over the plurality of routes and assembles it into a single stream.

Please amend the paragraph beginning at page 2, line 13, as follows:

According to another aspect of the ~~invention~~disclosure, an ~~internet~~Internet application has means arranged to identify whether a plurality of addresses requesting multiple requests for the same data are associated with the same end user, and where this is the case splits the requested data, and streams different parts of the data to the different addresses requesting it. According to a complementary aspect, the end user application is provided with means for generating a plurality of access requests for the same data to be delivered over a plurality of routes, each request conveying an indication of their common origin to the targeted internet application, and means for receiving the requested data and to assemble the data sent over the plurality of routes into a single stream for access by the user.

Please amend the paragraph beginning at page 2, line 23, as follows:

Buffering may be ~~necessary~~ provided if traffic is slower over one path than it is over another.

Please amend the paragraph beginning at page 2, line 25, as follows:

In a preferred embodiment the ~~internet~~ Internet application comprises means for identifying correlation codes associated with data requests, means for associating each such data request with any previous requests for the same data having the same correlation code, and means for splitting the requested data between the addresses associated with the data requests. The corresponding user terminal comprises means for generating a first access request having a correlation code indicative of its origin, means for determining whether the data rate of the data received in response to the first request meets a predetermined level, and means to generate one or more further requests over different routes using the same correlation code.

Please amend the paragraph beginning at page 3, line 3, as follows:

~~The invention offers~~ One or more disclosed embodiments offer an improved quality of service and improved download speed. ~~The invention requires~~ The disclosure provides that the internet application and the user equipment ~~[[to]]~~ co- operate such that the ~~internet~~ Internet application can identify addresses of users making use of this invention, but requires no changes to the core internet or IP networks currently deployed, or their component equipment (routers and access servers). The user may connect conventionally several times to the same internet service provider, or may prefer to simultaneously connect to multiple internet service providers-a capability known to be possible with multiple virtual channels, either permanent or switched.

Please amend the paragraph beginning at page 3, line 12, as follows:

Therefore with a simple change to the broadband access network, the end user client software and ~~internet~~-Internet application, the end user can receive non real time data at several times the rate of a user with only a single internet connection. The management and support systems of the access network may require modification to provide the ability to operate the user's broadband internet connection as a plurality of virtual channels, which may each be connected to a different ISP.

Please amend the paragraph beginning at page 3, line 18, as follows:

The greater delay, and greater variation in that delay, may ~~require~~-benefit from larger initial buffers and may result in the video taking longer to start up and appear on the screen after being requested. In one preferred arrangement a first stream is connected in the conventional way, others being added if the received bit-rate is not deemed adequate.

Please insert the following heading after the title beginning on page 3, before line 26, as follows:

--BRIEF DESCRIPTION OF THE FIGURES--

Please amend the paragraph beginning at page 3, line 26, as follows:

~~An embodiment of the invention~~The embodiments will now be described, by way of example, with reference to the drawings in which Figure 1 is a schematic illustration of a prior art conventional Single ISP Connection Service; Figure 2 is a schematic illustration of the

connection of three switched virtual connections(SVCs) to three Internet protocol(IP) Addresses;

Figure 3 is a schematic illustration of why streaming would not work over multiple conventional
SVCs;

Please amend the paragraph beginning at page 4, line 1, as follows:

Figure 4 is a schematic illustration of a system operating according to ~~the invention~~an
embodiment, with correlated streaming over multiple paths; and

*Please insert the following heading after the title beginning on page 4, before line 5, as
follows:*

--DETAILED DESCRIPTION--

Please amend the paragraph beginning at page 4, line 5, as follows:

As shown in Figure 1, currently a single permanent virtual circuit (PVC) 10 is set up
between the user terminal ~~1~~15 of an ADSL user, and the access server 11. The access server 11
terminates the PVC 10 and the PPP (12) signaling encapsulated onto the PVC. It also gives the
end user terminal ~~1~~15 an IP address 1X to enable it to connect to the Internet 14 and send data to
any other Internet application, for example a broadcast webserver 13 (Figures 3 and 4).

Please amend the paragraph beginning at page 4, line 22, as follows:

If all three connections are made to the same destination server 13, the user terminal 15
of the arrangement in Figure 2 will not gain in overall information rate, because most of the data
will be duplicated. Figure ~~3~~13 shows how, using the existing IP network streaming protocols,

the server 3-13 being accessed would consider the user terminal 15 to be three different users because it receives requests from three different IP addresses 21 X, 22Y, 23Z. It would then send the same data to the end user terminal 15 over each of the three different routes, via the access servers 21,22, 23, so there is clearly little benefit in setting up extra SVCs and trying to downstream the data over them.

Please amend the paragraph beginning at page 4, line 31, as follows:

Consider the scenario where a user at the user terminal 15 is trying to downstream video at 500kb/s from a broadcast webserver 13 in another continent. Each of the connections 21,22, 23 are heavily loaded and can each only supply 200kb/s. The user will obtain useful data only at the rate of the fastest of the three connections.

Please amend the paragraph beginning at page 5, line 3, as follows:

In the embodiment shown in Figures 4 and 5, an enhanced streaming protocol is provided, containing a correlation ID or code from the end user. The correlation ID is chosen such that it is unlikely to be duplicated by other users. It could be generated in a variety of ways, either randomly or based on the user's unique address..

Please amend the paragraph beginning at page 5, line 15, as follows:

The user terminal 15 first makes an initial streaming request 51, including the unique correlation ~~code~~ID, over ~~a~~the first access server 21.

Please amend the paragraph beginning at page 5, line 17, as follows:

The broadcast webserver 13 checks this request against a store of previous requests (step 52) but fails to find any such requests with the same correlation code. Since this is the first request for this data that the ~~user~~user terminal 15 has made, no such previous request has been recorded and the video stream is returned to the user ~~1~~terminal 15 in the conventional manner (step 53).

Please amend the paragraph beginning at page 5, line 22, as follows:

The user terminal 15 now checks the data rate of the video stream against a predetermined value (step 54). If the data rate is too slow, the user terminal 1 transmits a similar request in step 55, using the same correlation ~~code~~ID but using a different access server 22.

Please amend the paragraph beginning at page 5, line 26, as follows:

The user terminal 15 may also start to show the video stream with the reduced quality dictated by the low bit rate, so that the user can see what is being received. Alternatively, the data may be buffered so that the stream can all be shown at full quality when the further stream or streams have been added. The reduction in quality of the first option is preferred when delay is undesirable, such as when a real-time signal is being transmitted, or if a user is sampling a number of feeds to see what is available.

Please amend the paragraph beginning at page 6, line 1, as follows:

The webserver 13 again checks this request made in step 55 against the store of previous requests (step 52) but this time recognises that the requests 51, 55, despite coming from different

IP addresses, 21 X, 22Y are in fact from the same origin 1. The server 3-13 then apportions the data between the connections 21,22 according to the rates they can each support (step 56). The information on attainable data rates can be obtained from, for example the TCP sliding window size in the current TCP/IP stack. The windows size adapts to the data throughput in the current Internet TCP session, [[,]] so it is a reasonably accurate representation of throughput. [[,]] A small data overhead ~~is required~~ may be provided in the transmitted data to identify the order in which the data is to be reassembled.

Please amend the paragraph beginning at page 6, line 11, as follows:

This process is repeated until the user terminal 1 determines (step 54) that the data rate is satisfactory (or all available addresses have been used), and then the received data is buffered and assembled in the correct order (step 57). Consequently, over several service providers 21,22, 23 the user's effective data rate would be the sum of the service providers' throughputs, rather than just the fastest one on its own. So in this example three 200kb/s connections would provide 600kb/s. Thus a 500kb/s TV stream could be supported by the three connections working together, where none of them could do so on its own. In order to avoid overloading of the network by users attempting vast numbers of parallel access attempts, the ~~internet~~ Internet application may limit the number of connections available to any given user. However, in practice a user attempting to use more than a few connections would experience no greater benefit, as the bandwidth of his own access connection would become the limiting factor.

Please amend the paragraph beginning at page 6, line 24, as follows:

The ~~invention~~disclosed embodiment may be used in conjunction with the ~~invention~~embodiments described in the applicant's co-pending International application filed on the same date as the present application and claiming priority from United Kingdom patent application 0225359.9.the content of which are hereby incorporated in its entirety. That other application describes a method of improving the latency (delay) of a signal by transmitting it in its entirety over several parallel channels such that, for each packet sent to the destination, the first instance of that packet to arrive is assembled with the first instance of the other packets to arrive to form a single output stream. For example using six feeds (IP Addresses), a stream may be split into two to double the bandwidth according to the present ~~invention~~disclosure, and then these two streams are then each duplicated three times to reduce delay.